

## 2015/2016 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on **3 July 2015**

### Supervisor Information (First named supervisor will be the contact):

Supervisor's Name and Title(s): Dr Anitra Carr and Dr Juliet Pullar

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### Research Category (Choose one category only – to be used for judging the students' presentations):

**Clinical**

**Laboratory X**

**Community**

### Project Title (20 words MAXIMUM):

**Vitamin C status of patients with severe infection and obesity**

### Project Description:

**Introduction.** Vitamin C is a potent antioxidant and anti-inflammatory agent which is an essential nutrient for humans due to genetic mutations which have resulted in the loss of our ability to synthesise it endogenously. Vitamin C levels can be seriously compromised during acute and chronic disorders, such as severe infection and diabetes or obesity, likely due to enhanced metabolic turnover of the vitamin during the disease process. In this project we would like to measure the vitamin C status of two patients groups at Christchurch Hospital, those with severe infection (pneumonia) and those undergoing bariatric surgery, with follow-up over one to twelve months and correlate vitamin C levels with markers of disease severity and patient outcomes.

**Aim.** To measure the vitamin C status of patient cohorts with severe infection and obesity and to correlate vitamin C status with markers of disease severity and patient outcomes.

**Objective 1.** To measure the vitamin C status of a cohort of hospital patients with severe infection (pneumonia) and to correlate vitamin C status with markers of disease severity and patient outcomes.

**Objective 2.** To measure the vitamin C status of obese patients undergoing bariatric surgery and on follow-up at one, three, six and twelve months following surgery (pilot study).

### Methods.

**Objective 1.** Blood samples have been collected from approximately 125 patients with community acquired pneumonia, recruited as part of the VIDCAPS study: 'Effect of adjunct high-dose vitamin D on radiographic and clinical outcomes of community acquired pneumonia in hospitalized adults'. Blood plasma collected at enrolment and six week follow-up has been stored at -80°C. The stored blood plasma will be deproteinated and treated with a reducing agent to recover total vitamin C which will then be analysed using the gold-standard method of high performance liquid chromatography (HPLC) with electrochemical detection.

The number of patients with hypovitaminosis C and deficiency will be determined and ANOVA will be used to compare the vitamin C distribution of these patients with community dwelling cohorts (e.g. university students and middle aged men and women). Vitamin C levels will be correlated with markers of disease severity, e.g. C-reactive protein and the CURB-65 pneumonia severity score, and patient outcomes, e.g. ICU admission, resolution of pulmonary inflammatory infiltrate on 6 week follow-up chest x-ray, length of hospital stay, in-hospital mortality, amount and duration of antimicrobial therapy, readmission to hospital, 6 week and 12 month mortality, resolution of symptoms, and return to normal activity.

**Objective 2.** Blood samples have been collected from 15 obese patients undergoing bariatric surgery, recruited as part of the 'Peroxiredoxin oxidation in diabetes and the effects of bariatric surgery study'. Blood plasma collected prior to surgery and at one, three, six and twelve month follow-up has been stored at -80°C. The stored blood plasma will be processed and analysed for vitamin C content by HPLC as described above. The changes in vitamin C status of the patients will be compared with healthy controls and correlated with markers of oxidative stress, e.g. peroxiredoxin. This objective will comprise pilot data for a larger cohort study currently being planned.

**Student Prerequisites (eg. Medical Student) if applicable:**

**Basic bioscience or health science background. Prior laboratory and HPLC experience preferred.**